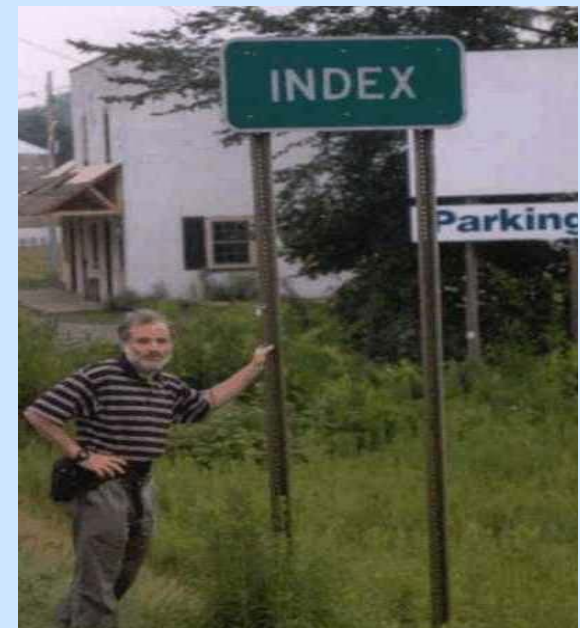


What Do We Mean by Reducing Energy Intensity?

(You Can't Reduce What you can't see)

Lee Schipper
Co-Director, EMBARQ
World Resources Institute
Washington DC
May 2002



⑩ Index, New York,
⑩ (near Cooperstown),
⑩ wWhere Indicators were Invented

Improving Efficiency or Reducing Intensity

Ground Rules for Clear Language

- **E/GDP Does not Measure Efficiencies or Efficiency**
 - Mixes Structural and Intensity Factors
 - Mixes Structural and Intensity Changes over Time (“Japanese Mirrors”)
 - More than Half of US Energy for Consumption of GDP
 - A Country is not “Efficient”: only People and Factors
 - Therefore, Lowering US Energy Intensity” A Fuzzy Goal
- **Energy Services = Area heated, Distance Traveled, Steel Produced etc.**
- **Energy Intensities are ratios of Energy Use/Energy Service**
- **Energy Saved = Change in An Intensity x Energy Service Level**
- **Productivity and Efficiency Must Consider all Inputs**
 - Intensities do not get Better or Worse, only Higher or Lower
 - Structural Changes contributed very little

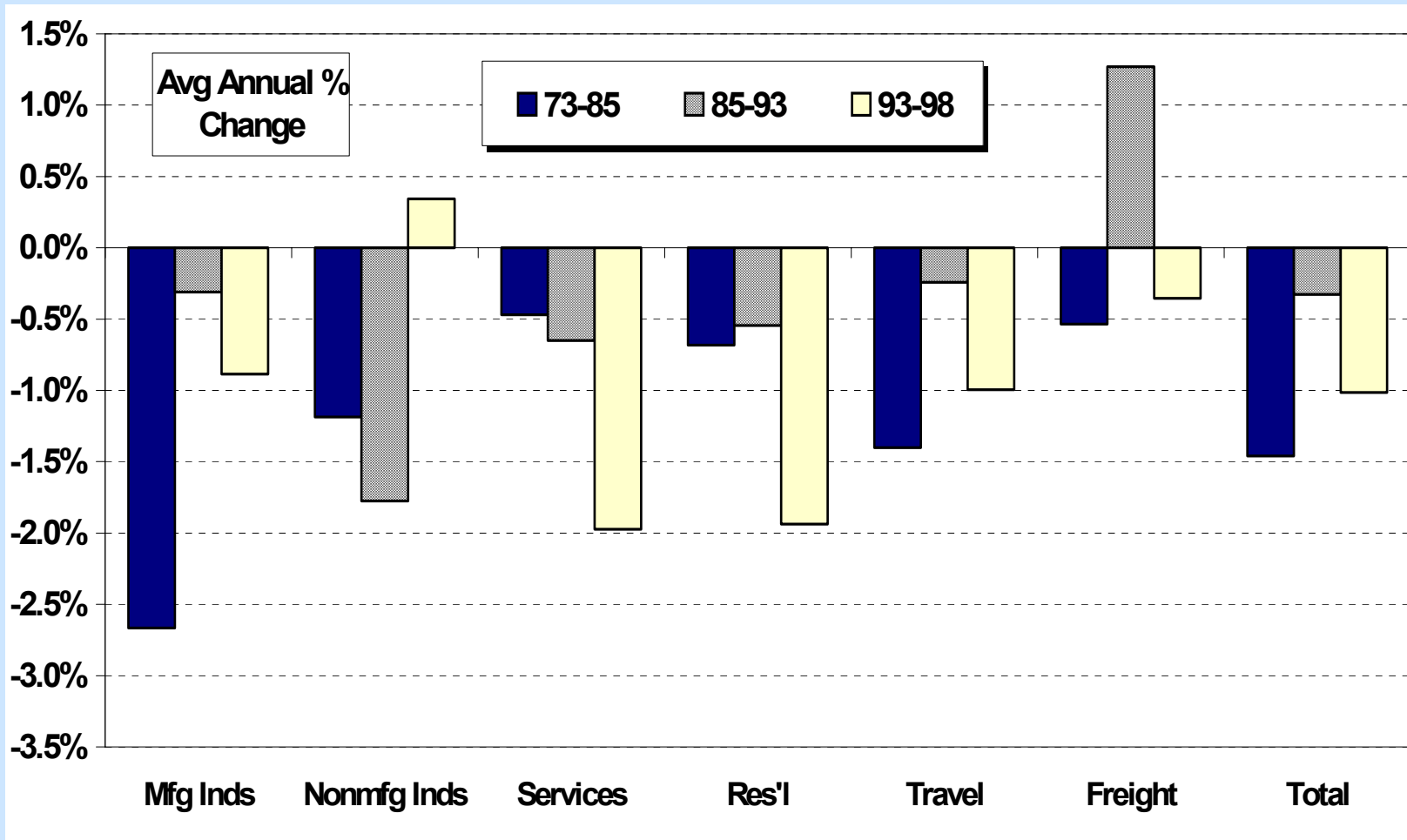
1970-1998: US Energy Saving Slowed Down

(Murtishaw and Schipper En Pol Dec 2001)

- 1970-1985: Rapid Decline in E/GDP
 - Energy Intensities Fell 2%/year
 - Structural Changes Reduce Energy Use More
- 1985-1993: Slower Decline, Slower Savings
 - Energy Intensities fell ~1%/year
 - Structural Changes contributed very little
- 1993-1998: Rapid Decline, little Savings
 - Energy Intensities Fell ~ 1%/year
 - Structural Changes Contributed > 2%/year
- Post 1998: Data Do Not Permit Breakdown
- The Internet Economy: Where are the Savings?

THE KEY ROLE OF ENERGY SERVICES*

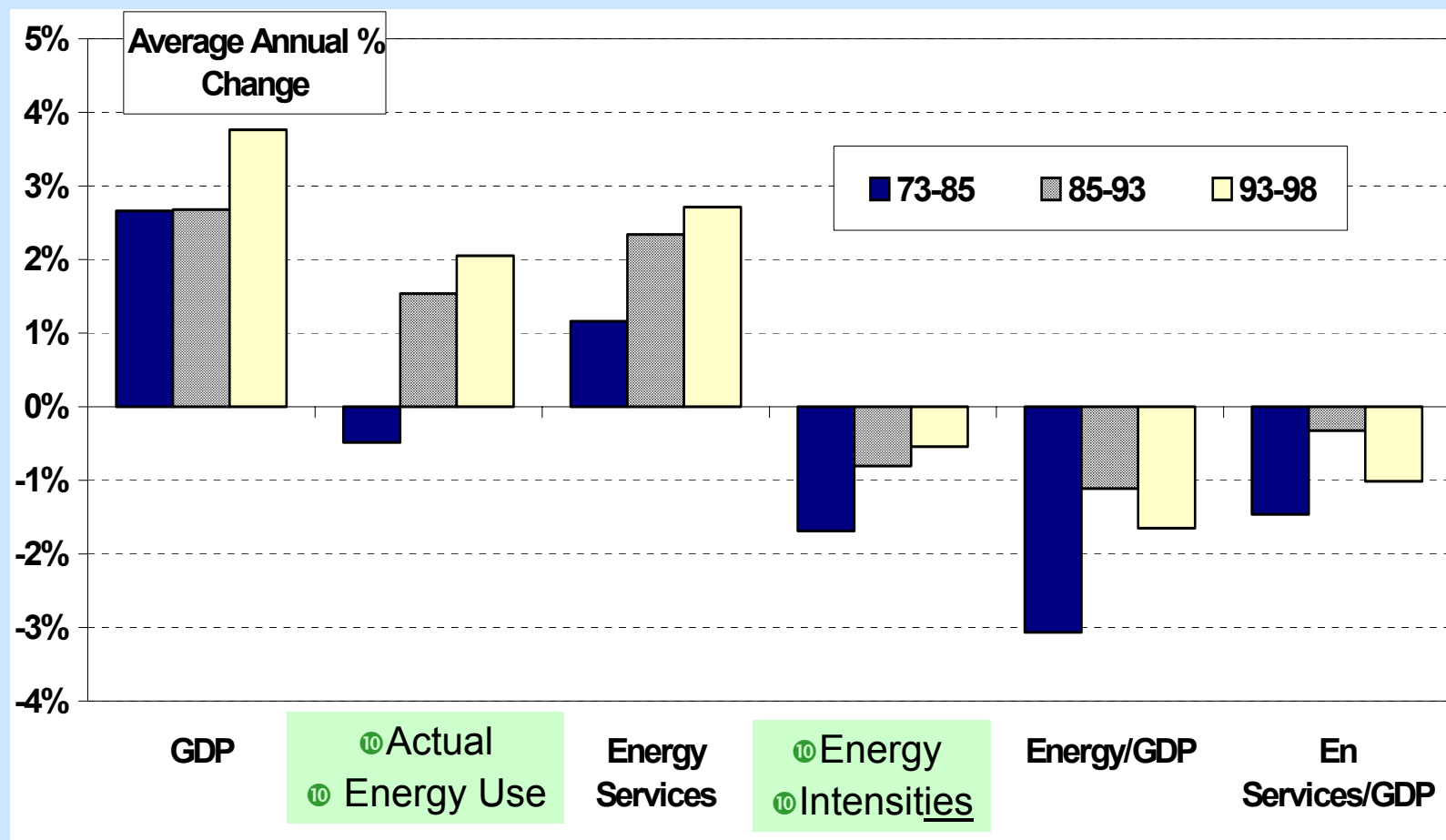
In 1990s, Energy Service/GDP Levels Fell



* Measured Using AWD Indices, 32 End-Uses

US ENERGY SUMMARY USING INDICES*

Impact of Each Change on US Energy Use



* Measured Using AWD Indices, 32 End-Uses

Energy/GDP: The Soccer Moms

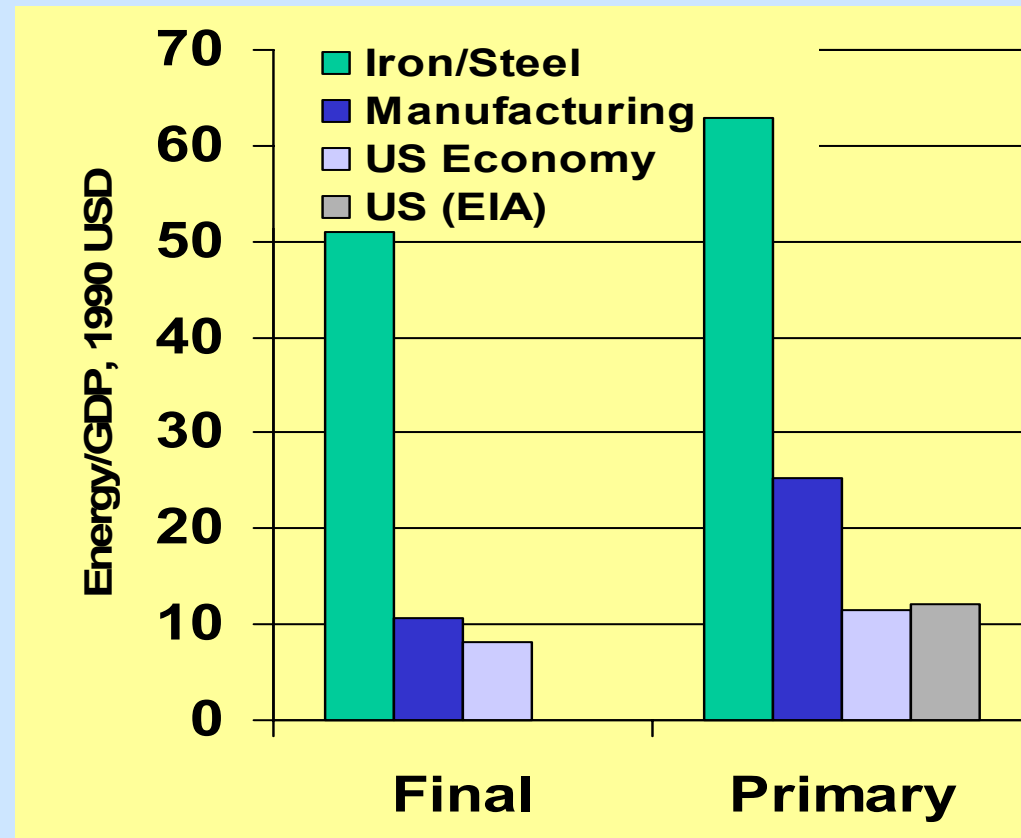
- Since 1982, new “car” fuel economy has stagnated, then worsened in the mid 1990
- If Soccer Moms Need SUVs, then this driving to matches raises Raise E more than GDP
- French Soccer Moms get twice the Mileage of American Moms, but France Won world Cup (1998), European Cup (2000) and 2nd in Rugby (2000)
- US Has Wrong Soccer Strategy or Wrong Fuel Economy Strategy?



Energy/GDP

The Steel Industry

- Steel Industry has higher E/GDP than the Economy
- Increasing Steel Production Relative to GDP Raises E/GDP
- E/GDP Reduction Goal conflicts with Major White House Initiative
- E/GDP Poor Measure of Goal Achievement



US Energy Use?

WHY TAKING ITS PULSE IT IS SO HARD TODAY

- ◆ YEARLY EIA DATA TOO AGGREGATED
- ◆ SECTORAL SURVEYS TOO FAR APART
 - ◆ MECS, RECS, CBECS Every 4-5 Years
 - ◆ Little Ability to Inter- or Extra-polate
- ◆ MOTOR VEHICLES EVEN WORSE
 - ◆ No Regular Distance and Fuel Data for Light Duty Vehicles
 - ◆ Fair Estimates for Trucking Only Every Five Years (VIUS)
 - ◆ Therefore, no Reliable On-Road Fuel Economy Figures

**Energy/GDP POOR MEASURE of EFFICIENCY;
ITS CHANGES CANNOT BE A GOAL**

SAVING ENERGY IN THE US?

Why, Where, How?



◆ Why Me Worry?

- Oil Security: The US Is Unlikely under any set of policies to raise oil production significantly (e.g. <2 mmb/d)
- Greenhouse Gas Emissions: US the largest emitter

◆ Milking Efficiency Requires FAR BETTER Dat

- Policies Need Careful Monitoring
- Impact of Efficient Technologies Needs Validation

◆ Rekindle and Retune Efficiency Policies?

- At Present US Cannot See How Efficient it Is
- Hard to Change What You Cannot See

Recharging Future Improvements

What is on the Table? Is there a Table?

- ◆ Higher Fuel Prices? Had Enormous Impact 73-85
- ◆ Long Term Technical Progress?
 - ◆ Already Counted in Forecasts?
 - ◆ Not Always Saving Energy : Increases in Car Size/Power
- ◆ Efficiency Policies?
 - ◆ CAPPUCINO (Stronger CAFÉ), New Insulation Programs?
- ◆ Structural Change Policies? Usually the Wrong Way
 - ◆ Subsidized Home Ownership Means More Sprawl

**Measuring Impacts of These Effects Difficult with
Present Data**

Recharging Future Improvements

Good Indicators Defeat the Stereotypes

- ◆ Myth: We Can't Afford Higher Fuel Prices
 - ◆ *Fuel Costs <8% of Overall Economy*
 - ◆ *Better Surveys Would Pinpoint the True Pain*
- ◆ Myth: The Rebound Effects Will Eat Up Savings
 - ◆ *In Most Sectors, Rebounds < 20% of Efficiency Improvement*
 - ◆ *For Car Power/Size, This IS Important, however.*
- ◆ Myth: The Market Will Take Care of It All
 - ◆ *Market Failures Do Exist in Key Sectors (cars, appliances)*
- ◆ Myth: The Internet Uses 8% of All Electricity
 - ◆ *Good Analysis shows Figure much lower*

Don't Let Poor Data And Myths Block Good Ideas

Summary: If We Mean Energy Efficiency

- Big Savings of 1970s/1980s Are Over
- US Can't Measure Energy Efficiencies in Timely Way
 - New, Slower Savings Hard to Measure
 - You Can't Change What You Can't See
- “Causes” Of Improvements not Easy or Popular to Harness through Policies, Particularly with Poor Information
 - CAFÉ Very Contentious
 - “No Regrets Measures” Already Counted?
- Motivation for Saving Strong Enough?
 - Oil Security, GHG Emissions Have Few REAL Supporters

**Energy/GDP POOR MEASURE of EFFICIENCY;
ITS CHANGES CANNOT BE A GOAL**